



National Transportation Safety Board

Office of Railroad, Pipeline and Hazardous Materials Investigations
Human Performance and Survival Factors Division
Washington, DC. 20594

Survival Factors¹ Factual Report – Addendum # 4

Site Survey Map Documentation Compiled for the Investigation

June 25, 2008

*Failure of Dixie Pipeline Company Pressurized Underground Transmission Pipeline, and
Subsequent Liquid Propane Release and Fire, near Carmichael, MS, on November 1, 2007*

NTSB Accident Number: DCA 08 MP 001

Compiled by: // s // Date June 25, 2008
Survival Factors – Group Chairperson
Mechanical Engineer (Crashworthiness)
Investigator / Survival Factors – Working Group Chairperson

Compiled by: // s // Date June 26, 2008
Gerald D. Weeks, PhD.
Chief, Human Performance and Survival Factors Division
Office of Railroad, Pipeline, and Hazardous Materials Investigations

¹ The scope of the Survival Factors Factual Report [in pipeline accident investigations] exclusively addresses the emergency preparedness and response, and injury causation aspects of the investigation.

Report Content Synopsis²

As support to the Investigation, two organizations performed separate, formal, engineering survey mapping of the accident site, which were utilized by the Survival Factors investigation to identify the overall configuration of the accident site, to the extent possible, and to characterize the infrastructure elements involved in the accident (e.g. topographical features, location / orientation of residential dwellings and fatalities [relative to the pipe rupture location], approximate dimensions of the [woodland/grassland] fire damaged area, perimeter boundary of the measured flame-front extension, etc.).

The full content of the site survey map documentation, as provided to the Investigation, (as included in this report, which is comprised of 20 pages, inclusive) is briefly summarized as follows³.

a. Dixie / Enterprise Products

Dixie / Enterprise Products commissioned a professional engineering survey contractor by the name of Environmental Mapping Services, Inc.⁴, to conduct a survey of the accident site, in which a series of four survey maps were compiled for the investigation, which commence in sequence on the following page, are identified as follows.

Sheet Title / Description

1. “Contour and Feature Plan W/ Aerial, 12 inch Propane Pipeline, Carmichael Station to Stopper Plug, Carmichael, Mississippi”, dated 12-19-07, showing topographical features as imposed upon an aerial photograph.
2. “Contour and Feature Plan, 12 inch Propane Pipeline, Carmichael Station to Stopper Plug, Carmichael, Mississippi”, dated 12-19-07, showing topographical features.
3. “Plan and Profile, 12 inch Propane Pipeline, Carmichael Station to Stopper Plug, Carmichael, Mississippi”, dated 11-04-07, showing the overall site configuration.
4. “Plan and Profile, 12 inch Propane Pipeline, Carmichael Station to Stopper Plug, Carmichael, Mississippi”, dated 11-04-07, showing the rupture site configuration.

General Notes of this document

- maps are drawn to scale, but have been photo-reduced to fit on these pages.
- all four maps are referenced as Environmental Mapping Services project # 07H094.

² as further described in Survival Factors Factual Report of the Investigation; see § 5.4.1.

³ this report is a transmittal of all the map documentation received in the Investigation, whereas a partial content of map documentation (as received from Mississippi Highway Patrol / C.R.A.S.H. Team) is provided in Survival Factors Factual Report - Exhibit 6.

⁴ address: P. O. Box 15369, Hattiesburg, MS 39404, and [Internet] >> <http://www.env-mgt.com/>



b. Mississippi Highway Patrol / C.R.A.S.H. Team

The Mississippi Highway Patrol responded their C.R.A.S.H. Team resource to the site, which compiled a report (comprised of a series of five documents) to describe the accident site, which commence in sequence on the following page, are identified as follows.

Item Title / Description

1. “MHP C.R.A.S.H Team Report, Case Number AR32-071101-45, Location: Community of Carmichael, Mississippi”, dated Nov. 07, 2007, which provides the report narrative content (5 pages, inclusive).

2. as an Appendix to Item 1, a diagram (site survey sheet) showing the entire affected area (overall scene).

Editorial Note - this document describes the entire affected area, encompassing both the ‘cluster of six residential dwellings’ and the ‘cluster of five residential dwellings’ at the site.

3. as an Appendix to Item 1, “Inset A” to Item 2: a diagram (site survey sheet) showing the location of pipeline and major affected area.

Editorial Note - this document describes the location of the pipeline and major affected area, which also shows, in detail, the area of the ‘cluster of six residential dwellings’ at the site.

4. as an Appendix to Item 1, “Inset B” to Item 2: a diagram (site survey sheet) showing the location configuration of the four burned-out residential dwellings and vehicles, and fatalities.

Editorial Note - this document describes further detail of inset A, depicting the location configuration of the four burned-out residential dwellings and vehicles, and fatalities.

5. as an Appendix to Item 1, Measurement Data Log for the diagrams (site survey sheets) presented in the report.

General Notes of this document

- not all of the residential dwelling structures involved in the accident are cited in the maps⁵.
- maps are drawn to scale, but have been photo-reduced to fit on these pages.
- all documentation is referenced as Mississippi Highway Patrol Case Number AR32-071101-45.

⁵ several residential dwellings, which were relatively undamaged, are not included in this map series



**MHP C.R.A.S.H. Team
Report**

Case Number:
AR32-071101-45

Incident Date:
November 1, 2007

Incident Location:
Community of Carmichael, Mississippi
Clarke County, Mississippi

MHP C.R.A.S.H. Team Member:
S/Sgt. J. Michael Cain
Accident Reconstruction Specialist
MHP C.R.A.S.H. Team
Troop H
Telephone Number:
601-693-1926

TABLE OF CONTENTS

Narrative.....3
Appendices.....5

NARRATIVE

This report is being generated to reflect the work performed by this writer at the request of the Mississippi Bureau of Investigations and the National Transportation Safety Board concerning a pipeline explosion which occurred on November 1, 2007 near the community of Carmichael, Mississippi, which is located in Clarke County, Mississippi.

I was contacted by Special Agent Jerome Lee, B-26, of the Mississippi Bureau of Investigations by phone at approximately 1436 hours on November 1, 2007 requesting my services at the scene of a pipeline explosion near the community of Carmichael, Mississippi. I responded immediately to the scene arriving at approximately 1530 hours. I then met with Special Agent Danny Knight, B-36, of the Mississippi Bureau of Investigations who requested that a forensic mapping of the site be done. Myself and Special Agent Knight walked the scene to determine the scope of the mapping and specific items to be included. I conducted a preliminary site examination in preparation to conduct the forensic mapping of the scene and had MHP Meridian dispatch to contact Master Sergeant George Edmonds, A-32, and notify him of the situation and request his assistance to conduct the forensic mapping on the following day. I departed the scene at approximately 1839 hours on November 1, 2007.

On November 2, 2007 myself and Master Sergeant Edmonds returned to the scene arriving at approximately 0815 hours. We conducted forensic mapping of the scene to show the location of dwellings in the affected areas, the location of the two deceased victims and the location of damaged vehicle in the affected areas. We concluded our forensic mapping at approximately 1413 hours on November 2, 2007.

On November 3, 2007 at approximately 1000 hours I was contacted by Mr. Rod Dyck of the National Transportation Safety Board who is their lead investigator concerning this incident.

Mr. Dyck requested that I return to the site in order to perform mapping concerning the location of the ruptured portion of the pipeline and include that information in my diagrams of the area. I returned to the site arriving at approximately 1130 hours and performed the additional mapping as requested by the National Transportation Safety Board.

All data from the forensic mapping was compiled and scale diagrams of the affected area have been prepared with copies distributed to Special Agent Danny Knight, B-36, of the Mississippi Bureau of Investigations and Mr. Rod Dyck of the National Transportation Safety Board.

Submitted By:

J. Michael Cain, H-6
November 7, 2007

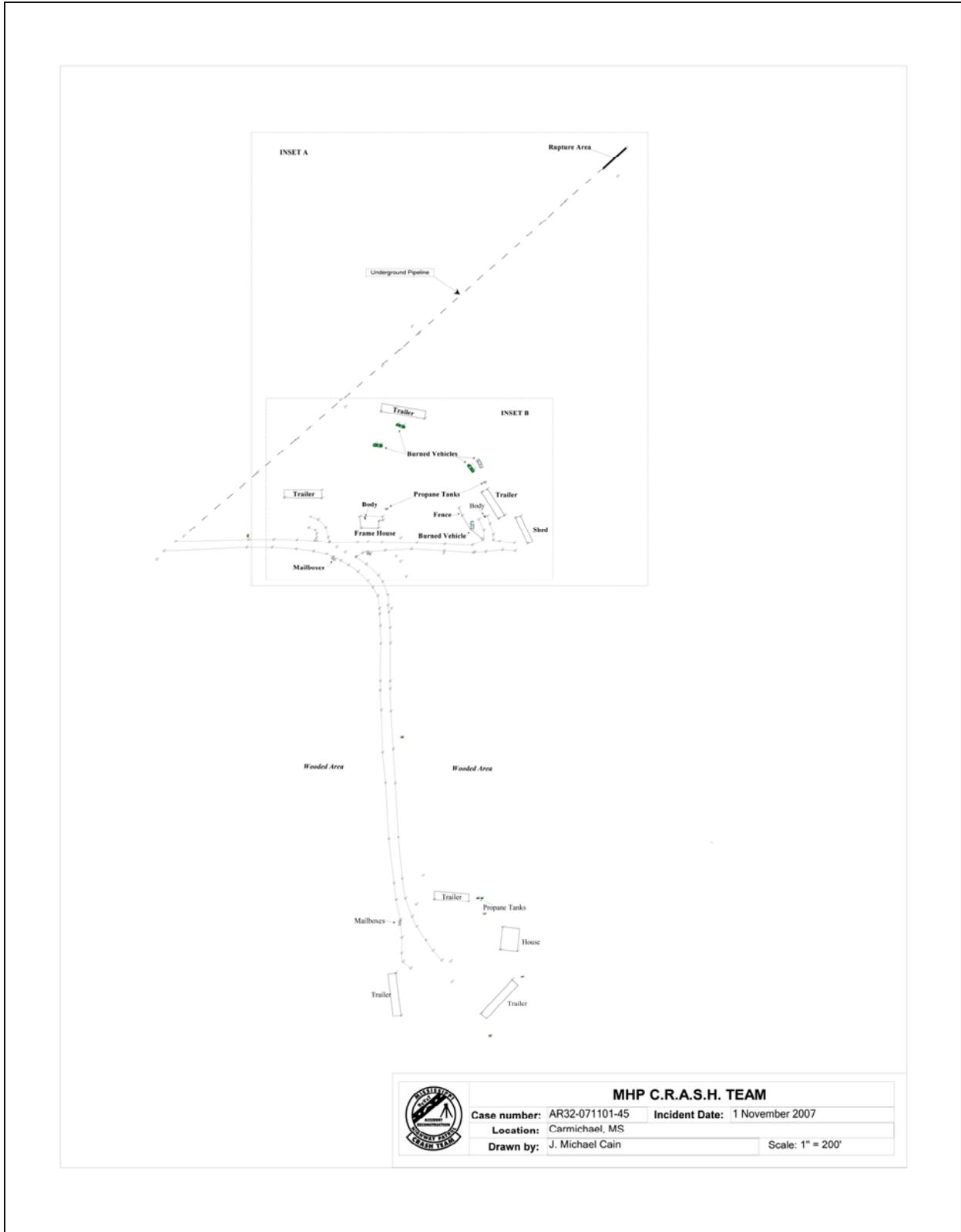
APPENDICES

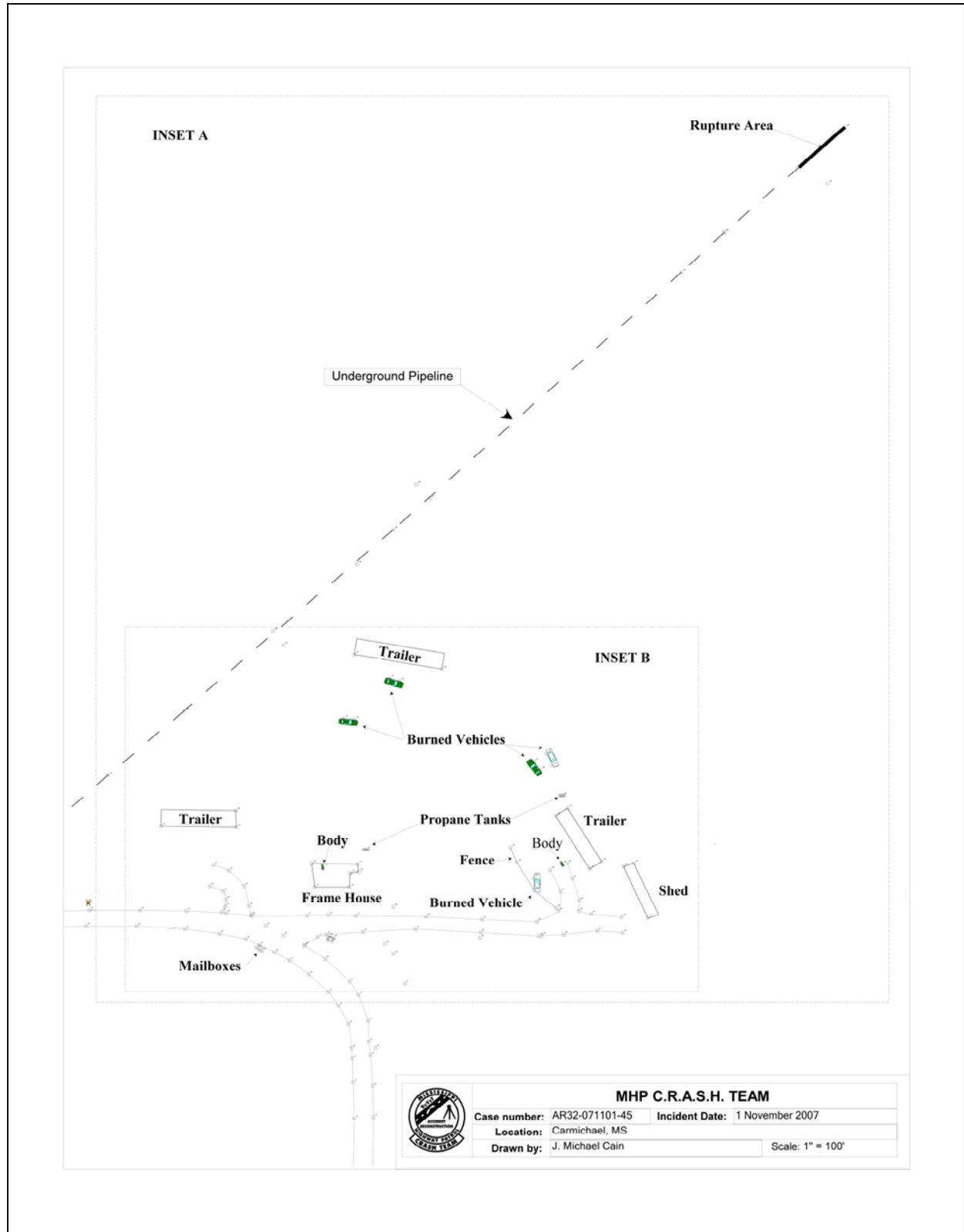
DIAGRAM SHOWING ENTIRE AFFECTED AREA.

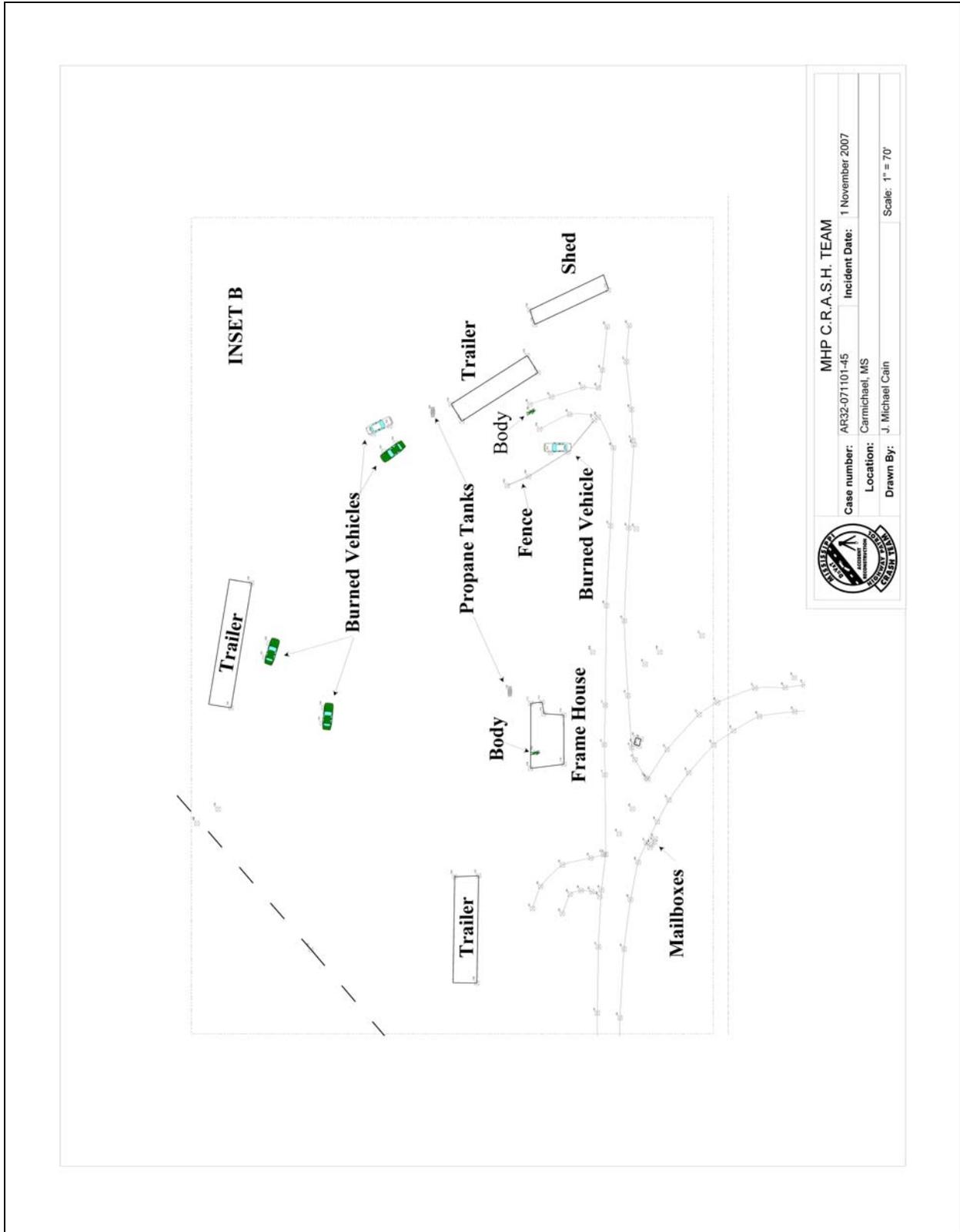
INSET A: DIAGRAM SHOWING LOCATION OF PIPELINE AND MAJOR AFFECTED AREA.

INSET B: DIAGRAM SHOWING LOCATIONS OF DWELLINGS, VEHICLES AND VICTIMS IN MAJOR AFFECTED AREA.

TOTAL STATION MEASUREMENT LOG







Mississippi Highway Patrol C.R.A.S.H. Team

Measurement Data Log

File Number	AR32-071101-45	Scene Measured By	J. Michael Cain
Incident Date/Time	1-Nov-2007 11:05 AM	ID Number (measured by)	H-6
Incident Location	Carmichael, MS	Scene Assisted By	G. Edmonds
Date Measured On	1-Nov-2007	ID Number (assisted by)	A-32
Weather Description	Clear	Reference Point Description	set point
Road Description		Secondary Reference Point	
		Visibility Description	Unlimited

Point	N	S	E	W	Elev.	Description
1	0.0000		0.0000		0	Instrument Station 1
2	41.6190			0.0008	-2.105668	Reference Measurement
3		563.8180	3.4643		3.913538	Road Edge
4		571.2457		11.2428	4.258412	Road Edge
5		492.9143		20.3720	2.502822	Road Edge
6		489.7635		3.4976	2.273221	Road Edge
7		393.4023		8.7634	0.01383875	Road Edge
8		392.9831		26.2665	0.06704	Road Edge
9		338.9317		31.4401	-1.1786	Road Edge
10		333.6320		12.7359	-1.521024	Road Edge
11		312.3651	3.2349		-3.062254	Utility Pole
12		265.6765		16.7925	-2.365191	Road Edge
13		263.9249		33.9227	-2.425433	Road Edge
14		228.8965		35.8761	-2.671211	Road Edge
15		226.6414		18.2053	-2.60369	Road Edge
16		212.4740		18.1501	-2.775931	Road Edge
17		212.2543		35.7223	-2.684629	Road Edge
18		145.9528		34.8262	-2.132854	Road Edge
19		144.7527		17.7335	-2.403277	Road Edge
20		116.9421		18.2836	-1.72183	Road Edge
21		113.6086		35.6288	-1.628729	Road Edge
22		92.8331		36.4687	-1.152688	Road Edge
23		89.7485		20.3268	-0.9465721	Road Edge
24		83.5816		15.8680	-0.6668311	Phone Box
25		83.7783		36.9608	-1.11184	Road Edge
26		77.8401		21.9894	-0.4643197	Road Edge
27		59.2036		22.3731	0.3629019	EP1
28		61.8897		39.9255	-0.8898513	EP2

Printed from VistaFx 2

Point	N	S	E	W	Elev.	Description
28		61.8897		39.9255	-0.8898513	EP2
29		45.8264		48.8808	-0.6745866	EP2
30		35.8710		31.2354	1.02506	EP1
31		26.1294	10.3268		0.7187558	POLE2
32		24.3437		38.8319	6.379122	EP1
33		33.3870		57.7071	5.215563	EP2
34		17.9810		75.0550	5.921324	EP2
35		4.5165		60.5107	6.65715	EP1
36	7.4896			78.9783	6.870829	EP1
37		5.7868		91.9934	6.439817	EP2
38	1.5441			105.5239	6.510538	EP2
39	16.9744			97.5408	1.922059	EP1
40	25.2389			112.9790	2.237015	EP1
41	8.2326			118.6579	1.580218	EP2
42	2.8263			116.1077	-3.034308	MB1
43	3.3027			118.1578	-1.650903	MB2
44	4.9566			119.6894	2.106828	MB3
45	6.1165			121.3742	2.058411	MB4
46	13.4667			130.6493	1.79517	EP2
47	33.5208			125.8674	2.305145	EP1
48	36.2686			148.1180	2.522526	EP1
49	18.1618			153.9982	2.427666	EP2
50	22.2024			184.6417	3.539836	EP2
51	38.1084			183.3961	3.446938	EP1
52	38.8237			224.5248	5.229853	EP1
53	24.7232			227.5397	5.137624	EP2
54	24.9651			272.2728	7.508703	EP2
55	38.7729			269.2038	7.614742	EP1
56	45.6492			270.3883	11.48605	POLE3
57	34.8529			125.9529	2.203422	GE1
58	42.7337			128.0909	1.830638	GE1
59	60.4931			132.3505	0.264725	GE1
60	74.0015			145.8281	0.2421245	GE1
61	79.1062			159.5564	0.344897	GE1
62	60.4931			162.7384	1.14173	GE2
63	55.7525			150.5906	0.5903855	GE2
64	48.8388			148.3115	1.438573	GE2
65	42.1652			149.0471	2.340476	GE2
66	37.2863			152.0697	0	GE2
67	11.5902			54.2033	-3.054286	BOX
68	14.7728			53.1131	-3.03456	BOX
69	16.0197			57.1024	-2.436331	BOX
70	12.8759			58.3927	-2.478338	BOX
71	34.0184			76.3109	0.3283543	EP3

Printed from VistaFx 2

Point	N	S	E	W	Elev.	Description
71	34.0184			76.3109	0.3283543	EP3
72	8.5375			78.2355	1.556545	EP4
73	15.4919			66.8380	0.171272	EP4
74	17.3685			59.4418	-0.2797648	EP4
75	34.5119			57.5321	-0.8834164	EP3
76	9.0391			7.5311	1.912782	POLE4
77	33.8430			32.9457	-1.850945	EP3
78	19.7374			26.9900	-2.197016	EP4
79	22.0458		19.5316		-3.67236	EP4
80	33.0889		28.9855		-4.013591	EP3
81	30.6485		78.6510		-5.635942	EP3
82	19.2671		77.2954		-5.481179	EP4
83	14.7251		76.8204		-4.88611	POLE5
84	16.0950		129.0860		-6.629436	EP4
85	28.8224		127.2192		-6.681471	EP3
86	28.8224		127.2192		-6.6815	GE3
87	16.7506		131.7574		-6.656819	GE4
88	17.5258		150.9964		-6.89	GE4
89	38.2194		146.2440		-6.75047	GE3
90	55.9050		148.0307		-6.464218	GE3
91	20.7491		180.8107		-6.908136	GE4
92	19.0332		203.3384		-7.064744	GE4
93	32.6849		202.5681		-6.775686	GE5
94	35.6106		175.5323		-6.831104	GE5
95	38.0430		164.4406		-6.726594	GE5
96	47.8255		164.8192		-6.439545	GE5
97	67.2306		158.8025		-6.458738	GE5
98	80.7188		154.2369		-6.109498	GE5
99	79.9467		149.5105		-6.260112	BODY1
100	74.6189		138.8176		-0.8613148	GE3
101	67.8600		124.2976		-6.738322	LF1
102	40.7716		144.1852		-6.863783	Fence
103	57.1315		124.5259		-6.989429	Fence
104	81.5442		109.3645		-6.539062	Fence
105	94.7570		103.7692		-5.888643	Fence
106	113.5770			205.9001	1.25193	HOUSE1
107	112.5076			139.1572	-0.3376656	HOUSE1
108	127.3150			139.7526	0.1973475	HOUSE1
109	80.2449			72.2697	-2.184717	HOUSE2
110	77.3645			62.4036	-2.318676	BODY
111	80.0621			31.7559	-2.326493	HOUSE2
112	73.0911			31.0316	-1.662591	HOUSE2
113	71.9594			38.1966	-2.593589	HOUSE2
114	59.6406			39.0843	-0.4322234	HOUSE2

Printed from VistaFx 2

Point	N	S	E	W	Elev.	Description
114	59.6406			39.0843	-0.4322234	HOUSE2
115	59.5796			69.6651	-0.3613042	House 2
116	93.0117			24.5024	-4.195777	Butane Tank 1
117	31.9682		225.4348		-5.730764	Shed 1
118	77.6643		204.0235		-5.003503	Shed 1
119	80.6851		212.9584		-4.888925	Shed 1
120	82.3120		184.6011		-4.987818	House 3
121	75.6334		173.9955		-5.443167	House 3
122	122.9308		143.8317		-4.557277	House 3
123	129.6149		154.3595		-4.139141	House 3
124	140.8316		149.5628		-3.929924	Butane Tank 2
125	167.6661		140.7356		-2.445651	RF 2
126	177.9036		135.8222		-2.342417	RR 2
127	171.3641		124.8705		-3.623175	RF 3
128	163.8826		130.1467		-3.574146	RR 3
129	253.4092		43.0505		0.3473543	House 4
130	242.5629		5.6998		0.05885	LF 4
131	245.2488			3.2212	0.32378	LR 4
132	266.2506			34.6442	1.92063	House 4
133	209.5833			44.1205	-0.8422	LR 5
134	208.6601			34.5123	-1.150903	LF 5
135	41.6195		0.0067		-6.302641	RM 2
136	274.3050			97.7030	3.790686	Instrument Station 2
137	287.4717			106.4988	4.533921	RM1
138	377.1307			0.1471	11.55269	Pipeline
139	216.5535			185.1178	8.115589	Pipeline
140	44.7791			384.1291	11.64409	426 Sign
141	158.8960			252.8165	2.798881	Pipeline
142	35.3260			398.6308	11.51919	Road Edge
143	3.6338			431.8372	12.23214	Sign
144	18.7388			419.1591	11.20582	Road Edge
145	287.4730			106.4970	4.534513	RM2
146		746.7792	91.1499		3.304567	Instrument Station 3
147		710.6537	88.6427		3.519627	RM1
148		600.3203		7.7645	0.8251159	Road Edge 2
149		597.7065	8.7616		0.5923259	Road Edge 1
150		557.9928	39.6409		0	Utility Pole 6
151		631.5575	20.8071		1.297602	Road Edge 1
152		637.1883		0.2402	1.67233	Road Edge 2
153		667.6492	2.4969		1.517976	Road Edge 2
154		696.2610	2.3527		1.089017	Road Edge 2
155		710.8631	4.6276		0.9180448	Road Edge 2
156		723.0511	18.1662		0.8892338	Road Edge 2
157		648.4129	29.0864		2.108004	Road Edge 1

Printed from VistaFx 2

Point	N	S	E	W	Elev.	Description
157		648.4129	29.0864		2.108004	Road Edge 1
158		672.7192	45.2896		2.49723	Road Edge 1
159		690.8973	57.7107		2.83354	Road Edge 1
160		708.9619	72.9685		2.850883	Road Edge 1
161		609.6901	28.2219		1.620748	Phone Box 3
162		639.3758		1.7698	2.28026	Mail Box 5
163		641.6392		1.5539	2.194228	Mail Box 6
164		643.9536		1.3729	2.282081	Mail Box 7
165		646.9636		2.2174	1.983972	Mail Box 8
166		599.7682	59.7062		0.2723877	House 5
167		604.2435	120.9967		0.02653193	House 5
168		626.0580	148.9319		2.054371	Utility Pole 7
169		649.2956	180.8844		2.055129	House 6
170		689.4290	176.8892		3.039692	House 6
171		692.5717	207.5566		2.52301	House 6
172		742.9721	198.3592		-0.27176	House 7
173		802.9171	142.6348		3.668058	House 7
174		806.3939	1.2700		-4.334957	House 9
175		730.8523		8.0897	-3.664102	House 9
176		597.3423	137.4016		-2.38568	Butane Tank 3
177		597.4394	144.4021		-2.463763	Butane Tank 4
178		738.0074	216.1088		23.5336	Utility Pole 8
179		842.6509	159.1074		19.00309	Utility Pole 9
180		710.5453	88.6334		-0.6978812	Reference Measurement
181	404.8006		32.7261		1.15424	Instrument Station 4
182	417.2617		20.3317		0	Reference Measurement
183	605.7477		255.2906		-19.31574	Pipeline
184	346.3706			32.3725	1.852108	Plastic Marker
185	684.5820		384.6128		-18.67611	Instrument Station 5
186	641.0042		293.1195		-21.32535	Reference Measurement
187	699.4796		359.5721		-22.96129	Beginning of Rupture
188	734.5051		400.1545		-20.05324	End of Rupture
189	641.0437		293.2378		-21.31376	Reference Measurement
190	0.0000		0.0000		0	

Printed from VistaFx 2

-- End of Report --